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Faunistic Studies on Aphodiinae Subfamily (Coleoptera, Scarabaeidae) of Kütahya (Turkey)

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A b s t r a c t : This study was done of 2003-2004 in Kütahya, western Turkey. In this study, 11 species, belonging to *Acanthobodilus*, *Acrossus*, *Aphodius*, *Chilo thorax*, *Colobo pterus*, *Coprimorphus*, *Eudolus*, *Euorodalus*, *Eupleurus*, *Melinopterus*, *Nialus* genera were found during the study period. Their chorotype, distributions in Kütahya, Turkey and worldwide are given. This is the first study of Scarabaeidae species occurring in Kütahya. *Coprimorphus scrutator* and *Melinopterus punctatosulcatus* ssp. *hirtipes* were new records for Asian part of Turkey. Also, *Acanthobodilus immundus*, *Acrossus luridus*, *Aphodius fimetarius*, *Chilo thorax distinctus*, *Colobo pterus erraticus*, *Coprimorphus scrutator*, *Eudolus quadriguttatus*, *Euorodalus paracoenosus*, *Eupleurus subterraneus*, and *Melinopterus punctatosulcatus* ssp. *hirtipes* are new records for Aegean Region of Turkey.

Key words : Aphodiinae, Fauna, Kütahya, Turkey.

Introduction

Turkey, the central of Asia, Europe and Africa continents, is located between 26° and 45° East Meridians according to Greenwich, between 36° and 42° North parallel according to Equator. Some parts of the country belong to Asia continent (Anatolia Peninsula), and the other belongs to Europe continent (Trakya Region). Also, the country is related to Africa continent according to these features, Turkey has three different bio-geographical regions, called as Euro-Siberian, Mediterranean and Iran-Turan. So, the country is a small continent according to its biodiversity (LODOS 1995).

Scarabaeidae is one of the biggest family in Coleoptera. There have been different studies on Aphodiinae subfamily in Turkey. Some of them were performed by TUATAY et al., (1967, 1972), BARAUD (1976), CARPANETO (1973, 1976, 1989, 1998, 2000), LODOS et al. (1978, 1999), ZIANI (2001), DELLACASA & KIRGIZ (2002).

The aim of this study was to determine Aphodiinae and the distributions of its members in Kütahya and its surroundings.

Material and Methods

This study was done between 2003 and 2004 in Kütahya and its surroundings. The sam-

ples were collected by hand and forceps and killed with ethyl acetate. Distribution and some features of the identified species were given according to LÖBL & SMETANA (2006) and LODOS et al. (1978, 1999). The coordinates of sampling localities are given in Table 1. The map of the sampling cities is given in Fig. 1.

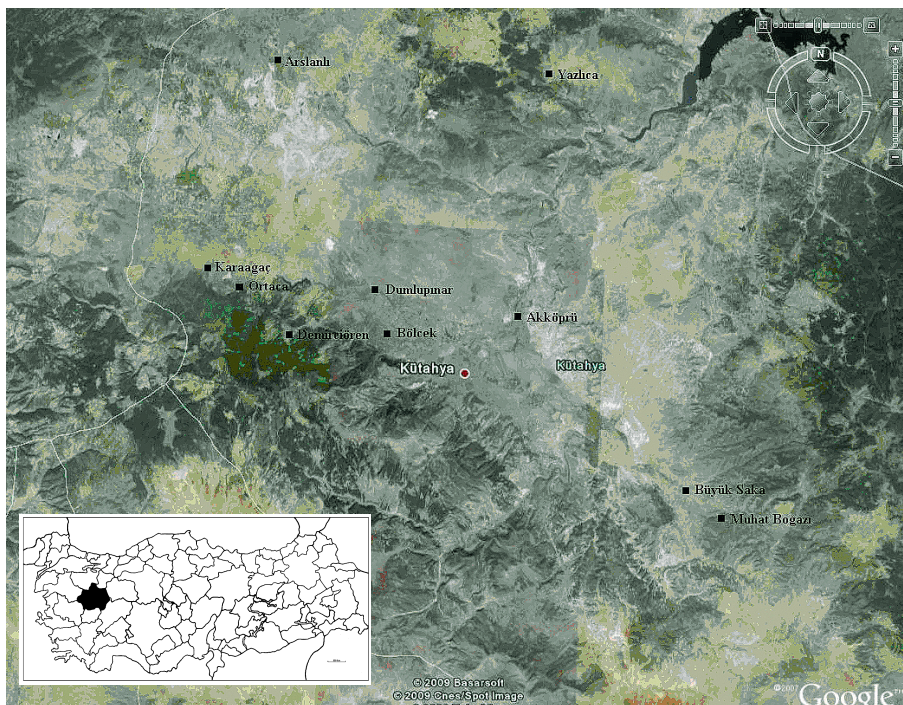


Fig. 1: Map of sampling cities.

The samples were identified according to SCHAUFUSS (1916), PAULIAN et al. (1959), BALTHASAR (1964), DELLACASA et al. (2001, 2002) by using Olympus SZX9 and then they were checked in Prof. Dr. Niyazi Lodos Collection in Ege University Campus.

Table 1: The Coordinates of sampling localities.

Localities	North	East	Altitude (m)
Akköprü	39° 27' 27,06"	30° 01' 31,50"	919
Arslanlı	39° 36' 13,50"	29° 50' 02,10"	1239
Bölcek	39° 26' 30,12"	29° 56' 25,98"	939
Büyük Saka	39° 21' 35,64"	30° 10' 14,70"	1000
Demirciören	39° 26' 19,86"	29° 51' 33,78"	1284
Dumlupınar	39° 27' 33,36"	29° 55' 11,22"	946

Localities	North	East	Altitude (m)
Karaağaç	39° 28' 13,38"	29° 47' 10,92"	1091
Muhat Boğazı	39° 20' 31,38"	30° 12' 07,86"	1070
Ortaca	39° 28' 03,00"	29° 48' 24,30"	1071
Yazlıca	39° 36' 28,98"	30° 02' 35,40"	1056

Results of Faunistic Studies

In this study, 11 species, belonging to *Acanthobodilus*, *Acrossus*, *Aphodius*, *Chilo thorax*, *Colobopterus*, *Coprimorphus*, *Eudolus*, *Euorodalus*, *Eupleurus*, *Melinopterus*, *Nialus* genera, were found during this research. The distribution of the identified species in Turkey, and also throughout were given alphabetically.

Acanthobodilus immundus, *Acrossus luridus*, *Aphodius fimetarius*, *Chilo thorax distinctus*, *Colobopterus erraticus*, *Coprimorphus scrutator*, *Eudolus quadriguttatus*, *Euorodalus paracoenosus*, *Eupleurus subterraneus*, *Melinopterus punctatosulcatus* ssp. *hirtipes*, *Nialus varians* are new records for Aegean region of Turkey.

Family S c a r a b a e i d a e LATREILLE 1802

Subfamily A p h o d i i n a e LEACH 1815

Acanthobodilus immundus CREUTZER 1799

Material examined: Akköprü, 15.05.2004, Şenyüz Y. leg. and det., 1 ex.

Distribution in Turkey: Adana, Antalya, Bartın, Bolu, Gaziantep, İçel, Kahramanmaraş, Kastamonu, Kayseri, Kırşehir, Konya, Nevşehir, Osmaniye, Zonguldak (LODOS et al. 1999).

Distribution worldwide: Europe: Armenia, Austria, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, France, Georgia, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Macedonia, Poland, Portugal, Romania, Russia: Central European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Egypt, Morocco. Asia: Afghanistan, Cyprus, Iran, Iraq, Israel, Kazakhstan, Kyrgyzstan, Russia: East Siberia, Russia: Far East, Russia: West Siberia, South Korea, Syria, Tajikistan, Turkey, Turkmenistan. (LÖBL & SMETANA 2006).

Chorotype: Centralasiatic-European (CARPANETO et al. 2000).

Acrossus luridus FABRICIUS 1775

Material examined: Arslanlı, 30.05.2004, Şenyüz Y. leg. and det., 2 exx.; Ortaca, 11.04.2004, Şenyüz Y. leg. and det., 5 exx.; Yazlıca, 22.05.2004, Şenyüz Y. leg. and det., 12 exx.

Distribution in Turkey: Adana, Ankara, Antalya, Bartın, Bolu, Gaziantep, İçel, Kahramanmaraş, Osmaniye (LODOS et al. 1999).

Distribution worldwide: Europe: Albania, Armenia, Austria, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia: Central European Territory, Russia: North European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Morocco, Tunisia. Asia: China, Cyprus, Iran, Israel, Kazakhstan, Kyrgyzstan, Russia: East Siberia, Russia: Far East, Russia: West Siberia, Syria, Tajikistan, Turkey, Turkmenistan (LÖBL & SMETANA 2006).

Chorotype: Asiatic-European (CARPANETO et al. 2000).

***Aphodius fimetarius* LINNAEUS 1758**

Material examined: Bölcek, 24.09.2004, Şenyüz Y. leg. and det., 3 exx.; Dumlupınar, 15.05.2004, Şenyüz Y. leg. and det., 2 exx.; Dumlupınar, 23.09.2003, Şenyüz Y. leg. and det., 1 ex.; Büyük saka, 26.09.2003, Şenyüz Y. leg. and det., 1 ex.; Muhat boğazi, 26.09.2003, Şenyüz Y. leg. and det., 4 exx.; Ortaca, 11.04.2004, Şenyüz Y. leg. and det., 7 exx.; Demirciören, 24.09.2003, Şenyüz Y. leg. and det., 1 ex.

Distribution in Turkey: Adana, Antalya, Bartın, Bolu, Çorum, Gaziantep, Hatay, İçel, Kahramanmaraş, Kastamonu, Kayseri, Niğde, Osmaniye, Zonguldak (LODOS et al. 1999).

Distribution worldwide: Europe: Albania, Andora, Armenia, Austria, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Netherlands, Norway, Poland, Portugal, Romania, Russia, Russia: Central European Territory, Russia: North European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Algeria, Egypt, Libya, Madeira Archipelago, Morocco, Tunisia. Asia: Cyprus, India: Kashmir, Iran, Iraq, Israel, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia: East Siberia, Russia: Far East, Russia: West Siberia, Sinkiang, Syria, Tajikistan, Tibet, Turkey, Turkmenistan, Uzbekistan. Australian Region, Nearctic Region, Neotropical Region, Oriental Region (LÖBL & SMETANA 2006).

Chorotype: Asiatic-European (CARPANETO et al. 2000).

***Chilothorax distinctus* MÜLLER O.F. 1776**

Material examined: Ortaca, 11.04.2004, Şenyüz Y. leg. and det., 1 ex.; Arslanlı, 30.05.2004, Şenyüz Y. leg. and det., 1 ex.

Distribution in Turkey: Antalya, Bartın, Bolu, İçel, Karaman, Kastamonu, Konya, Niğde (LODOS et al., 1999).

Distribution worldwide: Europe: Albania, Armenia, Austria, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Italy, Kazakhstan, Latvia, Lithuania, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia:

Central European Territory, Russia: North European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Libya, Tunisia. Asia: Kazakhstan, Mongolia, Russia: East Siberia, Russia: West Siberia, Turkey, Nearctic Region (LÖBL & SMETANA 2006).

C h o r o t y p e : Centralasiatic-European (CARPANETO et al. 2000).

***Colobopterus erraticus* LINNAEUS 1758**

M a t e r i a l e x a m i n e d : Dumlupınar, 15.05.2004, Şenyüz Y. leg. and det., 2 exx.; Akköprü, 15.05.2004, Şenyüz Y. leg. and det., 3exx.

D i s t r i b u t i o n i n T u r k e y : Adana, Ankara, Antalya, Bartın, Bolu, Çorum, Gaziantep, Hatay, İçel, Kahraman Maraş, Karaman, Kastamonu, Kayseri, Kırşehir, Niğde, Osmaniye, Sakarya, Zonguldak (LODOS et al. 1978, 1999).

D i s t r i b u t i o n w o r l d w i d e : Europe: Albania, Armenia, Austria, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia: Central European Territory, Russia: North European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Algeria, Morocco, Tunisia. Asia: Afghanistan, China, Cyprus, Iran, Iraq, Israel, Kazakhstan, Kyrgyzstan, Lebanon, Mongolia, Pakistan, Russia: East Siberia, Russia: Far East, Russia: West Siberia, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan, Xizang, Nearctic region, Oriental Region (LÖBL & SMETANA 2006).

C h o r o t y p e : Asiatic-European (CARPANETO et al. 2000).

***Coprimorphus scrutator* HERBST 1789**

M a t e r i a l e x a m i n e d : Karaağaç, 25.09.2003, Şenyüz Y. leg. and det., 2 exx.

D i s t r i b u t i o n i n T u r k e y : Edirne, Kırklareli (DELLACASA & KIRGIZ. 2002).

D i s t r i b u t i o n w o r l d w i d e : Europe: Armenia, Austria, Azores, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, France, Georgia, Germany, Great Britain, Greece, Hungary, Italy, Macedonia, Moldavia, Poland, Portugal, Romania, Russia: Central European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Canary Islands. A s i a : Iran, Turkey (LÖBL & SMETANA 2006)

C h o r o t y p e : Turano-European (DELLACASA & KIRGIZ 2002).

***Eudolus quadriguttatus* HERBST 1783**

M a t e r i a l e x a m i n e d : Arslanlı, 30.05.2004, Şenyüz Y. leg. and det., 3 exx.

D i s t r i b u t i o n i n T u r k e y : Adana, Antalya, İçel, Kahramanmaraş, Kastamonu, Osmaniye, Zonguldak (LODOS et al. 1999).

D i s t r i b u t i o n w o r l d w i d e : Europe: Albania, Armenia, Austria, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, France,

Georgia, Germany, Greece, Hungary, Italy, Kazakhstan, Latvia, Lithuania, Malta, Netherlands, Poland, Portugal, Romania, Russia: Central European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Algeria, Egypt, Libya, Morocco, Tunisia. Asia: Afghanistan, China, Cyprus, Iran, Iraq, Israel, Jordan, Kazakhstan, Kyrgyzstan, Russia: East Siberia, Russia: West Siberia, Syria, Tajikistan, Turkey, Turkmenistan, Uzbekistan (LÖBL & SMETANA 2006).

C h o r o t y p e : Turano-Europeo-Mediterranean (CARPANETO et al. 2000).

***Euorodalus paracoenosus* PANZER 1798**

M a t e r i a l e x a m i n e d : Dumlupınar, 23.09.2003, Şenyüz Y. leg. and det., 1 ex.

D i s t r i b u t i o n i n T u r k e y : Adana, Hatay, Osmaniye (LODOS et al. 1999).

D i s t r i b u t i o n w o r l d w i d e : Europe: Albania, Armenia, Bulgaria, Belarus, Croatia, Czech Republic, France, Germany, Georgia, Greece, Hungary, Italy, Poland, Romania, Slovakia, Slovenia, Spain, Russia: South European Territory, Switzerland, Turkey, Ukraine, Yugoslavia. Asia: Iran (LÖBL & SMETANA 2006).

C h o r o t y p e : Sibero-European (DELLACASA et al. 2001).

***Eupleurus subterraneus* LINNAEUS 1758**

M a t e r i a l e x a m i n e d : Dumlupınar, 15.05.2004, Şenyüz Y. leg. and det., 1 ex., Ortaca, 11.04.2004, Şenyüz Y. leg. and det., 5 exx.

D i s t r i b u t i o n i n T u r k e y : Ankara, Antalya, Bolu, İçel, Kahramanmaraş, Karaman, Niğde (LODOS et al. 1999).

D i s t r i b u t i o n w o r l d w i d e : Europe: Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Georgia, Germany, Great Britain, Greece, Hungary, Ireland, Italy, Kazakhstan, Latvia, Lithuania, Netherlands, Norway, Poland, Romania, Russia: Central European Territory, Russia: North European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Algeria, Morocco. Asia: Kazakhstan, Kyrgyzstan, Mongolia, Russia: East Siberia, Russia: West Siberia, Tajikistan, Turkey, Turkmenistan, Uzbekistan. Nearctic Region. Sinkiang (LÖBL & SMETANA 2006).

C h o r o t y p e : Sibero-European (CARPANETO et al. 2000).

***Melinopterus punctatosulcatus* ssp. *hirtipes* FISCHER DE ALDHEIM 1844**

M a t e r i a l e x a m i n e d : Ortaca, 11.04.2004, ŞENYÜZ Y. leg. and det. 4 exx.

D i s t r i b u t i o n i n T u r k e y : Kırklareli (DELLACASA & KIRGIZ, 2002).

D i s t r i b u t i o n w o r l d w i d e : Europe: Azerbaijan, Belarus, Czech Republic, Estonia, Finland, Georgia, Greece, Kazakhstan, Latvia, Netherlands, Norway, Poland, Romania, Russia: Central European Territory, Russia: North European Territory, Russia: South European Territory, Slovakia, Sweden, Turkey, Ukraine,

Yugoslavia. Asia: Iran, Iraq, Kazakhstan, Kyrgyzstan, Mongolia, Russia: East Siberia, Russia: Far East, Russia: West Siberia, Tajikistan, Turkey, Turkmenistan, Uzbekistan (LÖBL & SMETANA 2006).

C h o r o t y p e : Asiatic European (CARPANETO et al. 2000).

***Nialus varians* DUFTSCHMID 1805**

M a t e r i a l e x a m i n e d : Akköprü, 15.05.2004, Şenyüz Y. leg. and det. 1 ex.

D i s t r i b u t i o n i n T u r k e y : Adana, Bilecik, Gaziantep, İçel, Karaman, Konya, Zonguldak (LODOS et al., 1978, 1999).

D i s t r i b u t i o n w o r l d w i d e : Europe: Albania, Armenia, Austria, Azerbaijan, Belarus, Belgium, Bosnia Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, France, Georgia, Germany, Great Britain, Greece, Hungary, Italy, Kazakhstan, Latvia, Lithuania, Macedonia, Netherlands, Poland, Portugal, Romania, Russia: Central European Territory, Russia: South European Territory, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, Yugoslavia. North Africa: Algeria, Morocco. Asia: Iran, Israel, Kazakhstan, Kyrgyzstan, Russia: West Siberia, Tajikistan, Turkey, Turkmenistan, Uzbekistan (LÖBL & SMETANA 2006).

C h o r o t y p e : Turano-Europeo-Mediterranean (CARPANETO et al. 2000).

Results

Chorological categories with number of species and percentage are summarized in Table III.

Conclusions

This subfamily is represented by 141 species and 4 subspecies according to 44 genus (LÖBL & SMETANA 2006) in Turkey. In this study, a total of 11 species were identified.

This is the first study for Kütahya Province and its surroundings. *Coprimorphus scrutator* and *Melinopterus punctatosulcatus* ssp. *hirtipes* were new records for Asian part of Turkey. In addition, *Acanthobodilus immundus*, *Acrossus luridus*, *Aphodius fimetarius*, *Chilothonax distinctus*, *Colobopteris erraticus*, *Coprimorphus scrutator*, *Eudolus quadriguttatus*, *Euorodalus paracoenosus*, *Eupleurus subterraneus*, and *Melinopterus punctatosulcatus* ssp. *hirtipes* were new records for Aegean Region of Turkey.

In Table III, the percentage and the number of species of the chorological categories are given. Table IV displays the values of results appeared from grouping this categories into main chorotypes. From the listed data, the numeric predominance of widely distributed Holarctic species (90,91 %). The European taxa is represented in 9,09 % of the total number.

Table II: **Chorotypes of species**

Taxa widely spread in Holarctic Region

Asiatic-European

*Acrossus luridus**Aphodius fimetarius**Colobopterus erraticus**Melinopterus punctatosulcatus*

Centralasiatic-European

*Acanthobodilus immundus**Chilo thorax distinctus*

Sibero-European

*Euorodalus paracoenosus**Eupleurus subterraneus*

Turano-European

Coprimorphus scrutator

Turano-Europeo-Mediterranean

*Eudolus quadriguttatus**Nialus varians***Table III:** Chorological categories with number of species and percentage.

Chorological categories	Number	%
Central Asiatic-European	2	18,18
Asiatic-European	4	36,36
Turano-European	1	9,10
Turano-Europeo-Mediterranean	2	18,18
Sibero-European	2	18,18
Total	11	100

Table IV: Main chorotypes with number of species and percentage.

Main chorotypes	Number	%
Holarctic	10	90,91
European	1	9,09
Total	11	100

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Zusammenfassung

Vorliegende Studie behandelt erstmals Aphodiinae (Coleoptera, Scarabaeidae), welche im Zeitraum 2003-2004 in Kütahya im Westen der Türkei aufgesammelt wurden. 11 Arten aus den Gattungen *Acanthobodilus*, *Acrossus*, *Aphodius*, *Chilo thorax*, *Colobopterus*, *Coprimorphus*, *Eudolus*, *Euorodalus*, *Eupleurus*, *Melinopterus*, *Nialus* wurden nachgewiesen. *Coprimorphus scrutator* und *Melinopterus punctatosulcatus* ssp. *hirtipes* sind Erstnachweise für den asiatischen Teil der Türkei. Zudem konnte das erstmalige Vorkommen von *Acanthobodilus immundus*, *Acrossus luridus*, *Aphodius fimetarius*, *Chilo thorax distinctus*, *Colobopterus erraticus*, *Coprimorphus scrutator*, *Eudolus quadriguttatus*, *Euorodalus paracoenosus*, *Eupleurus subterraneus* und *Melinopterus punctatosulcatus* ssp. *hirtipes* in der ägäischen Region der Türkei dokumentiert werden.

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